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Lightning Protection Components (LPC) - Part 1: Requirements for connection components

Blitzschutzbauteile - Teil 1: Anforderungen an Verbindungsbauteile  
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Composants de protection contre la foudre (CPF) - Partie 1: Prescriptions pour les composants de connexion

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**Ta slovenski standard je istoveten z: EN 50164-1:2008**

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**ICS:**

91.120.40 Zæ ää!^åÁ d^[[ Lightning protection

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EUROPEAN STANDARD  
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**EN 50164-1**

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English version

**Lightning Protection Components (LPC) -  
Part 1: Requirements for connection components**

Composants de protection  
contre la foudre (CPF) -  
Partie 1: Prescriptions pour  
les composants de connexion

Blitzschutzbauteile -  
Teil 1: Anforderungen  
an Verbindungsbauteile

This European Standard was approved by CENELEC on 2008-04-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

**CENELEC**

European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**Central Secretariat: rue de Stassart 35, B - 1050 Brussels**

## Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 81X, Lightning protection.

It includes the texts of EN 50164-1:1999 + A1:2006 and a draft amendment (prA2) which was submitted to the Unique Acceptance Procedure. The combined texts were approved by CENELEC as EN 50164-1 on 2008-04-01.

This European Standard supersedes EN 50164-1:1999 + A1:2006.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2009-04-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2011-04-01

EN 50164 is a family standard and consists of the following parts under the generic title "*Lightning Protection Components (LPC)*":

Part 1	Requirements for connection components
Part 2	Requirements for conductors and earth electrodes
Part 3	Requirements for isolating spark gaps
Part 4	Requirements for conductor fasteners
Part 5 1)	Requirements for earth electrode inspection housings and earth electrode seals
Part 6 1)	Requirements for lightning strike counters
Part 7	Requirements for earthing enhancing compounds

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1) In preparation.

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## 1 Scope

This European Standard specifies the requirements and tests for metallic connection components that form part of a Lightning Protection System (LPS). Typically these can be connectors, bonding and bridging components, expansion pieces and test joints.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 60068-2-52	1996	Environmental testing - Part 2: Tests -Test Kb: Salt mist, cyclic (sodium chloride solution) (IEC 60068-2-52:1996)
EN 62305-1		Protection against lightning - Part 1: General principles (IEC 62305-1)
EN 62305-3		Protection against lightning - Part 3: Physical damage to structures and life hazards (IEC 62305-3, mod.)
EN 62305-4		Protection against lightning - Part 4: Electrical and electronic systems within structures (IEC 62305-4)
EN ISO 6988	1994	Metallic and other non-organic coatings - Sulphur dioxide test with general condensation of moisture (ISO 6988:1985)
ISO 6957	1988	Copper alloys - Ammonia test for stress corrosion resistance

## 3 Definitions

For the purpose of this European Standard, the following definitions apply:

### 3.1

#### **connection component**

component for the connection of conductors to each other or to metal installations. This also includes bridging component and expansion piece

### 3.2

#### **metal installation**

extended metal items in the structure to be protected which may form a path for lightning current, such as pipes, staircases, elevator guide rails, ventilation, heating and air conditioning ducts, and interconnected reinforcing steel

### 3.3

#### **bridging component**

connection component for the connection of metal installations

### 3.4

#### **expansion piece**

connection component designed to compensate for changes in length in conductors and/or metal installations caused by temperature changes

### 3.5

#### **connector**

connection component to interconnect two or more conductors

**3.6****clamp**

connection component for the connection of conductors to metal installations

**3.7****pipe clamp**

clamp for the connection of conductors to metal pipes

**3.8****test joint**

a joint which is designed and situated to facilitate electrical testing and measurement of LPS

**3.9****connection range**

the range minimum to maximum on which a specific connection component is designed to be used

**3.10****bonding bar**

metal bar on which metal installations, external conductive parts, electric power and telecommunication lines, and other cables can be connected to an LPS

**4 Classification****4.1 According to its capability to withstand lightning current**

- class H for heavy duty;
- class N for normal duty.

**4.2 According to its installation**

- above ground or buried in ground;
- buried in concrete.

**5 Requirements****5.1 General**

Connection components shall be designed in such a manner that when they are installed in accordance with the manufacturer's instructions their performance shall be reliable, stable and safe to persons and surrounding equipment.

**5.2 Installation instructions**

The manufacturer of the connection components shall provide adequate instructions in his literature to ensure that the installer of the connection components can select and install them in a suitable and safe manner.

Compliance is checked by inspection.

**5.3 Lightning current carrying capability**

Connection components shall have sufficient lightning current carrying capability.

Compliance is checked in accordance with 6.3 following the manufacturer's declaration for the class H or N of the connection components in accordance with 4.1.

#### 5.4 Screwed clamping connection

Where screws and/or nuts are used as the clamping connection, the design shall be such that the conductor and/or the metal installation is always securely fastened by the screw and/or nut application.

Compliance is checked by inspection and in accordance with 6.3.

#### 5.5 Dismantling of test joints

It shall be possible to dismantle the test joints after lightning current stress.

Compliance is checked in accordance with 6.3.

#### 5.6 Damage to conductors and metal installations

Connection components shall be so designed that they connect the conductors and/or the metal installations without undue damage to the conductors, the metal installations and/or the connection components.

Compliance is checked by inspection.

#### 5.7 Safe connection

Connection components shall guarantee safe connection within the connection range declared by the manufacturer.

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Compliance is checked in accordance with 6.3.

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#### 5.8 Marking

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The connection components shall be marked at least with the following:

- a) manufacturer's or responsible vendor's name or trade mark;
- b) identifying symbol;
- c) the classification, i.e. class N or H.

Where this proves to be impractical the marking in accordance with b) and c) may be given on the smallest packing unit.

The marking shall be durable and legible.

NOTE Marking may be applied for example by moulding, pressing, engraving, printing adhesive labels, or water slide transfers.

Compliance is checked in accordance with 6.4.

#### 5.9 Terminals of bonding bars

Terminals of bonding bars used for lightning protection installations shall have connection sizes equal to or greater than 16 mm<sup>2</sup>.



## 6 Tests

### 6.1 General conditions for tests

**6.1.1** The tests in accordance with this standard are type tests.

**6.1.2** Unless otherwise specified, tests are carried out with the specimens assembled and installed as in normal use according to the manufacturer's or supplier's installation instructions with the recommended conductor materials, sizes and the tightening torques. If the connection component is suitable for various conductors' materials, then it shall be tested on each material combination.

**6.1.3** All tests are carried out on new specimens.

**6.1.4** Unless otherwise specified, three specimens are subjected to the tests and the requirements are satisfied if all the tests are met.

If only one of the specimens does not satisfy a test due to an assembly or a manufacturing fault, that test and any preceding one which may have influenced the results of the test shall be repeated and also the tests which follow shall be carried out in the required sequence on another full set of specimens, all of which shall comply with the requirements.

NOTE The applicant, when submitting a set of specimens, may also submit an additional set of specimens which may be necessary should one specimen fail. The testing station will then, without further request, test the additional set of specimens and will reject only if a further failure occurs. If the additional set of specimens is not submitted at the same time, the failure of one specimen will entail rejection.

**6.1.5** The test shall be carried out in the order given after conditioning/ ageing the arrangement of the specimen in accordance with 6.2.2.

### 6.2 Test preparation

#### 6.2.1 Arrangement of the specimen SIST EN 50164-1:2008

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If not otherwise specified by the manufacturer the conductors and the specimens shall be cleaned by using a suitable degreasing agent followed by cleaning in demineralising water and drying. They shall then be assembled in accordance with the manufacturer's instructions, e.g. with the recommended conductors and the tightening torques.

If a connection component is used in more than one arrangement (see Annex A) as recommended by the manufacturer's installation instructions, then it shall be tested for each one of these arrangements.

The basic arrangement of the specimen with cross connection component, parallel connection component, bridging component and equipotential bonding bar is shown in Figures 1, 2, 3 and 4 respectively. Terminals of bonding bars are only tested if the connection size is equal to or greater than 16 mm<sup>2</sup>. The test is carried out using the smallest conductor size within the range of the terminal with a minimum of 16mm<sup>2</sup> conductor. Typical arrangements for various LPC's are shown in Annex A.

NOTE It is permitted to test more than one arrangement of the specimen in series simultaneously. The actual number of the specimens to be tested is arbitrary and is dependent on the electrical test equipment.

#### 6.2.2 Conditioning/ageing

Following the manufacturer's declaration in accordance with 4.2 the arrangement of the specimen shall be subjected to a conditioning/ageing consisting of a salt mist treatment as specified in B.1 followed by a humid sulphurous atmosphere treatment as specified in B.2, and an additional ammonia atmosphere treatment for specimens made of copper alloy with a copper content less than 80 % as specified in B.3.

After the treatment the arrangement is fixed on an insulated plate taking care to avoid any damage to the specimen due to handling. The minimum distance between the specimen, conductors and the insulating plate shall be 20 mm.